Vol. 11 July 1935 No. 7

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS
from
TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Studies on a Diaminoacid, Canavanin (V).—On the natural occurrence of γ-ethyliden canalin, the condensation product between canalin and acetaldehyde during the fermentative hydrolysis of canavanin. (pp. 539～544): By Matsunosuke KITAGAWA, Kunio SAWADA and Yosio HOSOKI. (From Biochemical Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka, Japan.)

Investigation on Tea as to its Iodine Contents. (pp. 545～551): By Arao ITANO and Yasuhiko TUJI. (Ohara Institute for Agr. Experiments, Kurashiki, Japan.)

In the Preceding papers, a quantitative method[1] for determination of iodine was reported by which the iodine contents in seaweeds[2], agar[2] and soils[3] were determined, and the results were reported while this paper deals with the tea as to its iodine contents.

Since the presence of such substances in tea as thein and Vitamin C which have certain physiological significance, was experimentally demonstrated, the demand for tea seems to have been increased in spite of the fact that various kinds of beverages have been introduced to this country in recent years. As to the iodine contents in tea, a few meager information are available although the iodine itself has been known to play an important rôle in our diet and health.

Consequently different kinds of tea were taken and the iodine contents in the leaves themselves and the hot-water extract were determined, and the results are given here.

EXPERIMENTAL

Samples :– The following brands of tea were kindly donated by the Tea Experiment Station, Kyôto :

Sample No.	Kinds.	Manufacturer.	Notes.
1	Gyokuro	Kyoto Tea Expt. station.	prepared by machine.
2	Tentya	〃	Coarse tea.
3	Mattya	〃	Ground Tentya, after the stem and branches are eliminated.
4	Sentya	〃	Commercial brand of Uzi.
5	Sentya (A)	〃	Lower grade.
6	Sentya (B)	〃	Different species from 4 & 5.
7	Bantya	〃	Old leaves and small branches.
8	Kôtya	〃	
9	Oolongtya	Formosan Tea Expt. Station.	
10	Kinotya	Saga	Roasted Sentya.

Determination of iodine :–

a) In the leaves: The samples were ground into powder and 15 g were taken for analysis by the method previouly described[1]. In this case, five absorption bottles were used to catch all the smoke produced so that the loss of iodine was prevented.

b) In hot water extract: 50 g powdered leaves were placed in Erlenmyer flask (1 lit. volume) and 500 cc distilled water were added and boiled for 30 min ; filtered by the suction and the filter was washed with hot water until the filtrate amounted to 1.5 to 2 lit. and becomes almost colorless. To the filtrate, about 3 g CaO were added to make it alkalin and evaporated down to dryness, and the residue was subjected to analysis.

The results are shown in Table I and II.

TABLE I.—*Iodine Contents of different Kinds of Tea Leaves*

Sample No.	Iodine in 1 g air-dried tea leaves. (γ)	Iodine in 1 g oven-dried tea leaves. (γ)	Sample No.	Iodine in 1 g air-dried tea leaves. (γ)	Iodine in 1 g oven-dried tea leaves (γ)
1	1.202	1.244	6	0.814	0.846
2	1.112	1.162	7	0.439	0.455
3	1.221	1.281	8	0.759	0.729
4	1.057	1.094	9	1.106	1.169
5	1.084	1.127	10	0.714	0.750

$\gamma = 1/1{,}000$ mg

These results indicate that the iodine contents in these tea leaves vary from 0.455 to 1.281 γ and the samples No. 1, 2, 3, 4, 5 and 9 contained more than 1.0 γ while the others were less among which No. 7 was the least. From these results, it is difficult to reach any conclusion because the iodine contents may vary according to such factors as the locality and the manures used.

However it may be stated that more iodine is found in th leaves especially in the young leaves considering the nature of tea analysed. In other words, the better brands of commercial tea contain more iodine.

TABLE II.—*Iodine Contents in Hot-water Extract of tea.*

Sample No.	Iodine in 1 g oven-dried tea leaves. (γ)	Iodine in extract 1 g oven-dried tea leaves. (γ)	Iodine extracted. (%)
1	1.244	0.580	46.6
2	1.162	0.669	57.6
4	1.094	0.458	41.9
5	1.127	0.643	57.0
6	0.846	0.545	64.0
7	0.455	0.332	73.0
8	0.729	0.265	33.4
9	1.169	0.402	34.4
10	0.750	0.442	59.0

Note: Sample No. 3 was not included since the powdered leaves are used as a whole.

Table II indicates that 33～73 percent of the total iodine was extracted according to the brand of tea. In a majority of cases, 50～60 percent of the total iodine was extracted in hot water except in No. 8 and 9. It may be stated that in the fermented brand of tea such as No. 8 and 9, the amount of iodine extracted in rather small.

SUMMARY

The different brands of Japanese tea were analysed as to the iodine contents in their leaves and also in the hot-water extracts, and the results may be summarized as follows:

1) All the brands of tea contained various amounts of iodine, ranging from 0.45 to 1.20 in one gram of dried leaves, and it may be stated that the younger the leaves contained more iodine since the different brand of tea consists of leaves of different age.

2) By hot water, from 33 to 73 percent of the original iodine in the leaves was extracted according to the brand. On an average 50～60 percent of the total iodine was extracted.

LITERATURE

(1) Itano, A.: Berichte d. Ohara Inst. f. landw. Forschungen, VI, 53～58 (1933).
(2) Ibid. s. 59～71 (1933).
(3) Itano, A. and Y. Tuji: Ibids, 371～381 (1934).

Studies on the Carbohydrates of the Bulbs of Allium V.—Carbohydrates of Allium odorum; (Appendix: Carbohydrates of Onion) (pp. 548～551): By Yosijiro KIHARA. (Agr. Chemical Laboratory, Tokyo Imperial University, Japan.)

Studies on the Carbohydrates of the Bulbs of Allium VI.—Physico-chemical Properties of Scorodose. (pp. 552～557): By Yoshijiro KIHARA. (Agr. Chemical Laboratory, Tokyo Imperial University, Japan.)

Nutritive Value of Canavanin amino acid. (pp. 558～563): By Masayoshi OGAWA. (Dept. of Nutrition, Tokyo Municipal Hyg. Lab.)

In the previous communication the author reported the results of the 83 days experiment of a nutritive value of amino acid Canavanin, and concluded that Canavanin is one of an important amino acid for the growth, essentially in the early life of the animal.

In the present report, the author performed an experiment, which be fed young animals for 30 days increasing the administration of Canavanin up to 0.5 g per kg body weight per day, and obtained the following results.

(1) The animal administered Canavanin 0.5 g per kg body weight per day, were grew as well as those of which were administered 0.1 g of it per kg body weight per day.

(2) The average requirment of Canavanin for the growth of the young animals, seems to be between 0.05 g and 0.1 g per kg body weight per day.

Investigation on The Influeuce of Ultraviolet Ray on The Physiological Activities of Azotobacter. III.—Influence of Ultraviolet and Single Colored Rays on the Pigment Production. (pp. 564～573): By A. ITANO and A. MATSUURA. (Ohara Institute for Agr. Experiments, Kurashiki, Japan.)

The influence of ultraviolet and single colored rays on the pigment production of Azotobacter chroococcum was investigated by using the natural light, Hanovia mercury lamp and vitalite lamp as the source of rays, and obtained the following results:

(1) As in the case of growth experiment, the pigment production of Azotobacter was stimulated by a short exposure to the ultraviolet rays but the optimum exposure for the pigment production is longer than that for the

growth. For example, in case of Hanovia lamp ; 1 minute for the growth and 10 minutes for the pigment production.

(2) Among the single colored rays, black, red and green were better for the pigment production than violet and orange, which was the same in case of growth. The pigment production was very meager when the culture was left standing in a room or under white rays.

(3) As a rule, the pigment production was marked in the good growth but not always in parallel each other and sometimes it is reversed.

(4) Exposing Azotobacter for a long period to vitalite lamp, a marked difference was observed at the initial stage but the difference became less and less as the time passed. This seems to be due to the adaptability of the organism to the rays.

"On the Calcium-potassium Law named by Ehlenberg" (The first report). (pp. 574~588) : By Yoshiaki ISHIZUKA. (Dept. of Agric. Hokkaido Imp. Univ., Sapporo, Japan.)

The writer intended to investigate the cause of the phenomena named by P. Ehlenberg Kalk-Kali Gesetz which he described as "Wird für eine schwächer mit Kali versorgte Pflanze die Kalkzufuhr erheblicher gesteigert, so tritt hierdurch eine Zurückdrängung der Kali-aufnahme ein, welche erhebliche Schädigung im Gefolge haben kann ; durch einseitige Verstärkung der Kalidüngung kann aber wieder die Pflanze vor Kalküberschwemmung bewahrt und zu günstigerer, gegebenfalls normaler Entwicklung gebracht werden." The investigation was carried on from the standpoint of plant physiology and soil science, anticipating the following causes as controlling factors.

1. From the stand point of plant physiology.
   - A. The influence of the absolute amount of calcium given.
   - B. The influence caused by the change of calcium-magnesium ratio in nutrient medium as the result of successive addition of calcium.
   - C. The influence upon cell permeability resulting from the breakdown of the antagonistic balance between calcium and potassium caused by the successive addition of calcium.
   - D. The influence caused by the change of pH value of nutrient medium.
2. From the stand point of soil science.
   - E. The influence resulting from the change of the amount of exchangeable potassium in the soil caused by the successive addition of calcium.
   - F. The influence upon the solubility of potassium caused by the

change in pH value of the soil resulting from the successive addition of calcium.

For the first report the writer intended to investigate factor A by means of water culture using Rice Plant as the experimental plant, and attained the following conclusions.

(1) The growth of Rice Plant was gradually retarded as the calcium concentration of nutrient medium increased over 0.438×10^{-4} mol/L and was comparatively intensely retarded at 3.066×10^{-4} mol/L within the limits of our scheme of experiment.

(2) So the absolute amount of potassium absorbed by the plant was decreased as the concentration of calcium in nutrient medium increased and similarly its ash per cent and dry matter per cent were decreased.

(3) On the contrary the absolute amount of calcium absorbed by the plant was not decreased as the concentration of calcium in nutrient medium increased in spite of the retardation of growth. So its ash per cent and dry matter per cent were increased as the calcium concentration of nutrient medium increased.

(4) It is evident that the absorption of potassium was retarded as the calcium concentration of nutrient medium increased. But it can not be ascribed to the special physiological action of calcium toward potassium but it may be sound to consider that the absorption of potassium is necessarily decreased according to the amount of calcium overabsorbed, for the growth of plant decreased according to the increasing concentration of calcium while the amount of calcium absorbed does not decrease in parallel according to its retardation as the result of the high concentration of calcium in nutrient medium.

On the Basaltic Soils in Fukuoka Prefecture. (pp. 589～593): Rokuro KAWASHIMA.

(1) The climatic condition is as follows:

Meteor. station	Mean annual temp.	Mean Precipitation	Relative humidity	N-S Quatient
Fukuoka	14.9°C	1586. 7 mm	77.9	571

(2) Fine soil below 2 mm in diameter was treated with hot conc. HCl and analysed as usual. From the analytical data some molecular ratios are given as in the following table.

Soils from :	$\frac{SiO_2}{Al_2O_3}$	$\frac{SiO_2}{R_2O_3}$	$\frac{CaO+MgO+K_2O+Na_2O}{Al_2O_3}$	$\frac{CaO+K_2O+Na_2O}{Al_2O_3}$	$\frac{Fe_2O_3}{Al_2O_3}$
Tuyazaki, 1	2.25	1.17	0.18	0.05	0.92
" 2	3.12	1.31	0.33	0.02	1.37
Ainosima, 1	3.63	1.77	0.39	0.06	1.05
Nokonosima, 1	2.15	1.42	0.22	0.04	0.50
" 2	2.43	1.29	0.15	0.03	0.88

(3) Clay fraction below 0.001 mm in diameter was separated by settling method and analysed by using Hardy's Tri-acid mixture and hot conc. HCl. From the analytical results SiO_2/Al_2O_3, SiO_2/R_2O_3 and Fe_2O_3/Al_2O_3 are given :

Soils from :	by Tri acid			by HCl		
	$\frac{SiO_2}{Al_2O_3}$	$\frac{SiO_2}{R_2O_3}$	$\frac{Fe_2O_3}{Al_2O_3}$	$\frac{SiO_2}{Al_2O_3}$	$\frac{SiO_2}{R_2O_3}$	$\frac{Fe_2O_3}{Al_2O_3}$
Tuyazaki, 1	2.11	1.54	0.37	1.73	1.17	0.47
" 2	1.71	1.30	0.31	1.65	1.20	0.38
Ainosima, 2	1.91	1.52	0.26	2.23	1.70	0.30
Nokonosima, 1	2.22	1.61	0.38	1.90	1.38	0.37
" 2	1.87	1.46	0.28	2.31	1.71	0.35

(4) In considering the above tables, it is observed that the soil formation of sub-allitic nature is prevailing in these places.

On the Formation of Azulene from the Sesquiterpene alcohol of Fusel Oil. (pp. 594～599) : By Tomotsune TAIRA. (Chemical Laboratory of Takeda Co.)

Alkali Soluble inorganic Soil Colloids. (pp. 600～603) : Chikafumi ICHIKAWA. (Agr. College of Gifu, Japan)

Researches on Hard Tex Boards. (pp. 604～609) : Masuzo SHIKATA and Takaaki FUJII.

The properties of the hard tex boards from bagasse and straw prepared by the electric disturbance method, were described in the present paper.

On Systematic Study of Alcohol and Carbohydrate Oxidizing Bacteria isolated from Fruits, and a New Classification of the Oxidizing Bacteria (Continued). (pp. 610～620): By Toshinobu ASAI.
(Agr. Chemical Laboratory, Tokyo Imperial University.)
